AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of the Claims

1. (Previously Presented) An assay system, comprising:

a reaction apparatus comprising

a microfabricated chip having a plurality of electrodes, each electrode having a surface coated with a permeation layer, the chip being mounted on a printed circuit board,

a flow chamber comprising a first reaction area and a second reaction area within the flow chamber, wherein the first reaction area and the second reaction area are partially separated by a partition that is impermeable to a fluid, and wherein the flow chamber is mounted over the chip,

a plurality of tubes coupled to the flow chamber, and

an output connector for electrically coupling the reaction apparatus to a controller,

a controller electrically coupled to the reaction apparatus, and

a pump coupled to the plurality of tubes.

2. (Original) The system of claim 1 wherein the flow chamber further comprises a detection window.

3. (Original) The system of claim 1 further comprising:

a waveform generator electrically coupled to the electrodes to generate signals from the electrodes, and

an oscillator to monitor the signals from the electrodes.

4. (Original) The system of claim 1 wherein the plurality of electrodes comprises a first array of electrodes and a second array of electrodes, the first reaction area corresponds to the first array of electrodes, and the second reaction area corresponds to the second array of electrodes.

5. (Original) The system of claim 1 wherein the electrodes are disposed in a checkerboard biasing format.

6. (Original) The system of claim 1 wherein the electrodes comprise a first array of electrodes and a second array of counterelectrodes, the counterelectrodes being less in number than the electrodes.

7. (Original) The system of claim 1 further comprising capture probes immobilized on the permeation layer of the electrodes.

8. (Original) The system of claim 1 wherein the flow chamber has a volume of substantially 10 μl.

9. (Original) The system of claim 1 further comprising a fluid reservoir coupled to the pump.

10. (Original) The system of claim 1 wherein the flow chamber is substantially U-shaped, and the plurality of electrodes comprises a first array of electrodes situated within the first reaction area of the flow chamber and a second array of electrodes situated within the second reaction area of the flow chamber.

11. (Original) The system of claim 10 wherein the plurality of tubes comprises a first tube, a second tube, and a third tube, wherein the first and second tubes are coupled to the first reaction area and the third tube is coupled to the second reaction area.

12. (Original) The system of claim 10 wherein the first array of electrodes is greater in number than the second array of electrodes.

13. (Previously Presented) An assay system, comprising:

a reaction apparatus comprising:

a microfabricated chip having a plurality of electrodes, each electrode having a surface coated with a permeation layer, the chip being mounted on a printed circuit board,

a flow chamber comprising a first reaction area and a second reaction area within the flow chamber, wherein the first reaction area and the second reaction area are partially separated by a partition that is impermeable to a fluid, and wherein the flow chamber is mounted over the chip,

a plurality of tubes coupled to the flow chamber, and

an output connector for electrically coupling the reaction apparatus to a controller,

a controller electrically coupled to the reaction apparatus,

a pump coupled to the plurality of tubes, and

a laser subsystem configured to deliver excitation energy to the electrodes.

14. (Original) The system of claim 13 wherein the laser subsystem comprises a He-Ne laser component and an optic fiber coupled to the laser component, wherein the optic fiber is capable of delivering excitation energy to the electrodes.

15. (Original) The system of claim 13 further comprising a cooled color charge-coupled device capable of detecting signals from the electrodes, the signals being generated after the delivery of excitation energy to the electrodes.

16. (Original) The system of claim 13 wherein the flow chamber has a volume of substantially 10 μl.

17. (Currently Amended) A method of manipulating a biological sample comprising a mixture of desired and undesired cellular materials within a single apparatus including a chip, a first and second array of electrodes coated with a permeation layer, a channel-less flow chamber mounted over the chip and having a first reaction area corresponding to the first array of electrodes and a second reaction area corresponding to the second array of electrodes, and a laser subsystem configured to deliver excitation energy, wherein the first reaction area and the second reaction area are partially separated by a partition that is impermeable to a fluid, the method comprising:

pumping separation buffer into the flow chamber,

introducing the sample into the flow chamber,

applying an electric current to the first array of electrodes to bias the electrodes in a checkerboard format, and to provide field maxima at each electrode and field minima between the electrodes, wherein desired materials are collected at the field maxima and undesired materials are collected at the field minima,

washing away the undesired materials,

staining the desired materials, and

generating an image of the desired materials by using the laser subsystem to deliver excitation energy to the desired materials.

18. (Original) The method of claim 17 wherein the washing away of the undesired materials step is performed while the application of the electric current to the first array of electrodes is maintained.

19. (Original) The method of claim 17 wherein the staining step is accomplished with a fluorescent dye.

20. (Original) The method of claim 17 further comprising:

lysing the desired materials by subjecting the materials to a series of electronic pulses having alternate polarity, wherein the polarity of the pulses is alternated between the first and second array of electrodes.